

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



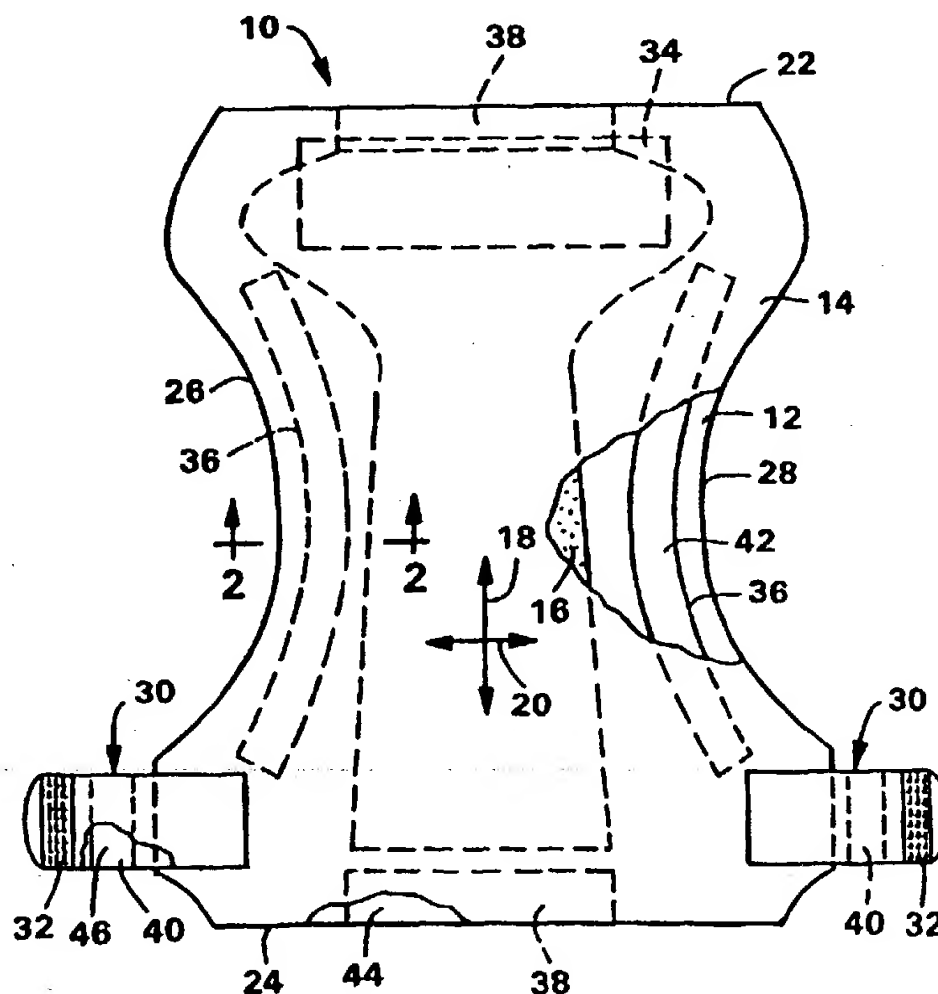
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>A61F 13/15, A61L 15/58</b>		(11) International Publication Number: <b>WO 97/17046</b>
A1		(43) International Publication Date: 15 May 1997 (15.05.97)
(21) International Application Number: PCT/US96/16081 (22) International Filing Date: 9 October 1996 (09.10.96) (30) Priority Data: 08/555,011 9 November 1995 (09.11.95) US (71) Applicant: KIMBERLY-CLARK WORLDWIDE, INC. [US/US]; 401 North Lake Street, Neenah, WI 54956 (US). (72) Inventors: ODORZYNSKI, Thomas, Walter; 255 Warren Court, Green Bay, WI 54301 (US). SHERMAN, Joel, Scott; 113 Green Meadows Street, Neenah, WI 54956 (US). (74) Agents: MIELKE, Thomas, J. et al.; Kimberly-Clark Worldwide, Inc., 401 North Lake Street, Neenah, WI 54956 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.          Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: DISPOSABLE ABSORBENT ARTICLE INCLUDING AN ELASTICIZED AREA

(57) Abstract

Disclosed is a disposable absorbent article having a length and a width. The disposable absorbent article defines a first and second waist portion and a first and second longitudinal marginal portion. The disposable article includes the components of a backsheet layer, a topsheet layer, and an absorbent structure located between the topsheet layer and the backsheet layer. The article includes at least one elasticized area formed from an elastomeric, hot melt, pressure-sensitive adhesive, a first component and a second component, said first and second components being adhered to one another by said elastomeric, hot melt, pressure-sensitive adhesive. The elastomeric, hot melt, pressure-sensitive adhesive and the elasticized area formed therewith have the following characteristics: a) an adhesive bond strength sufficient to adhere said first and second components together during use of said disposable absorbent article; b) an elongation of at least 50 percent; c) a retractive force of less than 400 grams force per inch width at 90 percent elongation; d) a viscosity of less than 70,000 centipoise at 350 °F; and e) a cold flow value of less than 20 percent at 54 °C.



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

## DISPOSABLE ABSORBENT ARTICLE INCLUDING AN ELASTICIZED AREA

Background of the Invention

5 The use of elastomeric materials to form elasticized areas in the design and construction of disposable absorbent articles is well known. Typically, such elasticized areas are formed by bonding elastomeric materials, such as natural or synthetic rubber, to the other components from which such disposable absorbent articles are formed. Generally, the elastomeric materials will be bonded to the absorbent article while the  
10 elastomeric materials are in a stretched condition. Upon relaxation, the elastomeric materials will operate to gather the components of the disposable absorbent articles to which they are attached. In this manner, elastomeric leg cuffs and waist gathers can be formed.

15 Attaching elastomeric materials to a disposable absorbent article while said elastomeric materials are in a stretched condition may be, from a manufacturing perspective, a difficult step to accomplish. Moreover, such elastomeric materials are typically attached to the disposable absorbent article through the use of adhesives such as hot melt  
20 adhesives. The presence of such adhesive has been found to reduce or eliminate the retractive forces exerted by such elastomeric material in the area in which the adhesives contact the elastomeric material and the disposable absorbent article to which they are attached.

25 Summary of the Invention

In one aspect, the present invention is directed to a disposable absorbent article having a length and a width and defining first and second waist portions and first and second longitudinal marginal portions. The absorbent article comprises the following components: a  
30 backsheet layer, a topsheet layer, and an absorbent structure located between said topsheet layer and said backsheet layer. The disposable absorbent article further includes at least one elasticized area formed

from an elastomeric, hot melt, pressure-sensitive adhesive, a first component and a second component, said first and second components being adhered to one another by said elastomeric, hot melt, pressure-sensitive adhesive. The elastomeric, hot melt, pressure-sensitive adhesive and the  
5 elasticized area formed therewith have the following properties:

- A. an adhesive bond strength sufficient to adhere said first and second components together during use of said disposable absorbent article;
- 10 B. an elongation of at least 50 percent;
- C. a retractive force of less than 400 grams force per inch width at 90 percent elongation;
- D. a viscosity of less than 70,000 centipoise at 350°F.; and
- E. a cold flow value of less than 20 percent at 54°C.

15

#### Brief Description of the Drawings

Fig. 1 illustrates a disposable absorbent article according to the present invention.

20 Fig. 2 is a cross-sectional view taken along line 2-2 of Fig. 1.

#### Detailed Description of the Preferred Embodiments

The present invention relates to a disposable absorbent article. The term "disposable absorbent article" is intended to refer to disposable  
25 articles intended to absorb discharged body fluids. Examples of disposable absorbent articles include diapers, adult incontinence products, training pants, feminine napkins, wound dressings, and the like. For ease of understanding, much of the following description will be made in terms of a disposable diaper. Nonetheless, it is to be  
30 understood that the present invention is equally suited for use on any disposable absorbent article.

The disposable absorbent article of the present invention can best be understood by reference to Fig. 1 in which a disposable infant diaper 10  
35 is illustrated. Disposable diaper 10 comprises the following components: a backsheet 12, a topsheet layer 14, and an absorbent structure 16 located between the backsheet layer 12 and the topsheet layer 14. The diaper 10 has a length in the direction of arrow 18 and a width in the

direction of arrow 20. The diaper 10 further comprises a first waist portion 22 and a second waist portion 24. As used herein, the first and second waist portions are those portions of diaper 10 which are generally located at the waist of a wearer when the diaper is in place on the  
5 wearer's body. The diaper 10 further defines a first longitudinal marginal portion 26 and a second longitudinal marginal portion 28. The diaper 10 further includes mechanical fastening tabs 30 comprising hook material 32 and a loop material 34 adapted to releasably engage with the hook material 32.

10

The backsheet layer 12 may suitably comprise a material which is either liquid permeable or liquid impermeable. It is generally preferred that the backsheet layer 12 be formed from a material which is substantially impermeable to liquids. It is also desirable that the backsheet layer 12  
15 be thin and flexible to improve consumer acceptance. For example, a typical backsheet layer can be manufactured from a thin plastic film or other flexible liquid-impermeable material. Examples of the material from which backsheet layer 12 may be formed include a polyethylene film having a thickness of from about 0.012 millimeter (0.5 mil) to about  
20 0.051 millimeter (2.0 mils). If it is desired to present the backsheet layer 12 with a more clothlike feeling, the backsheet layer 12 may comprise a polyethylene film having a nonwoven web laminated to the outer surface thereof such as a spunbond web of polyolefin fibers. For example, a polyethylene film having a thickness of about 0.015 millimeter  
25 (0.6 mil) may have thermally laminated thereto a spunbond web of polyolefin fibers, which fibers have a thickness of about 1.5 to 2.5 denier per filament (dpf), which nonwoven web has a basis weight of about 24 grams per square meter (0.7 ounce per square yard). Methods of forming such clothlike backsheet layers are known to those skilled in the  
30 art.

Further, the backsheet layer 12 may be formed of a nonwoven or woven fibrous web layer which has been totally or partially constructed or treated to impart a desired level of liquid impermeability to selected  
35 regions that are adjacent to the absorbent structure 16. Still further, the backsheet layer 12 may optionally be composed of a microporous, "breathable" material which permits vapors to escape from the absorbent

structure 16 while preventing liquid exudates from passing through the backsheet layer 12.

5 The topsheet layer 14 of the disposable diaper 10 suitably presents a body-facing surface which is compliant, soft feeling, and nonirritating to the wearer's skin. Further, the topsheet layer 14 may be less hydrophilic than the absorbent structure 16, to present a relatively dry surface to the wearer, and may be sufficiently porous to be liquid permeable, permitting liquid to readily penetrate through its thickness.

10 A suitable topsheet layer 14 may be manufactured from a wide selection of web material such as porous foams, reticulated foams, apertured plastic films, natural fibers (for example, wood or cotton fibers), synthetic fibers (for example, polyester or polypropylene fibers), or a combination of natural or synthetic fibers. The topsheet layer 14 is suitably

15 employed to help isolate the wearer's skin from liquids held in the absorbent structure 16.

Various woven and nonwoven fabrics can be used for the topsheet layer 14. For example, the topsheet layer may be composed of a meltblown or

20 spunbond web of polyolefin fibers. The topsheet layer may also be a bonded-carded web composed of natural and/or synthetic fibers. The topsheet layer may be composed of a substantially hydrophobic material. The hydrophobic material may, optionally, be treated with a surfactant or otherwise processed to impart a desired level of wettability and

25 hydrophilicity. In a particular embodiment of the present invention, the topsheet layer 14 comprises a nonwoven, spunbond, polypropylene fabric composed of about 2.8-3.2 denier per filament fibers formed into a web having a basis weight of about 22 grams per square meter and a density of about 0.06 gram per cubic centimeter. The fabric is surface treated with

30 about 0.28 weight percent of surfactant commercially available from Rohm and Haas Company under the trade designation Triton X-102.

The absorbent structure 16 of the diaper 10 may suitably comprise a matrix of hydrophilic fibers, such as a web of cellulosic fluff, mixed

35 with particles of a high-absorbency material commonly known as superabsorbent material. In a particular embodiment, the absorbent structure 16 comprises a mixture of superabsorbent hydrogel-forming particles and wood pulp fluff. The wood pulp fluff may be exchanged with

a synthetic, polymeric, meltblown fiber or with a combination of meltblown fibers and natural fibers. The superabsorbent particles may be substantially homogeneously mixed with hydrophilic fibers or may be nonuniformly mixed. Alternatively, the absorbent structure 16 may  
5 comprise a laminate of fibrous webs and superabsorbent material or other suitable means of maintaining a superabsorbent material in a localized area.

The high-absorbency material can be selected from natural, synthetic and  
10 modified natural polymers and materials. The high-absorbency materials can be inorganic materials, such as silica gels, or organic compounds, such as crosslinked polymers. The term "crosslinked" refers to any means for effectively rendering normally water-soluble materials substantially water insoluble, but swellable. Such means can include, for example,  
15 physical entanglement, crystalline domains, covalent bonds, ionic complexes, ionic associations, hydrophilic associations such as hydrogen bonding, and hydrophobic associations or Van de Waal forces.

Examples of synthetic, polymeric, high-absorbency materials include the  
20 alkaline metal and ammonium salts of poly(acrylic acid) and poly(methacrylic acid), poly(acrylamides), poly(vinyl ethers), maleic anhydride copolymers with vinyl ethers and alpha-olefins, poly(vinyl pyrrolidone), poly(vinyl morpholinone), poly(vinyl alcohol), and mixtures and copolymers thereof. Further polymers suitable for use in the  
25 absorbent structure include natural and modified natural polymers, such as hydrolyzed acrylonitrile-grafted starch, acrylic acid grafted starch, methylcellulose, carboxymethylcellulose, hydroxypropylcellulose, and the natural gums, such as alginates, xanthem gum, locust bean gum, and the like. Mixtures of natural and wholly or partially synthetic absorbent  
30 polymers can also be used in the present invention.

The high-absorbency material may be in any of a wide variety of geometric forms. As a general rule, it is preferred that the high absorbency material be in the form of discrete particles. However, the high  
35 absorbency material may also be in the form of fibers, flakes, rods, spheres, needles, or the like. As a general rule, the high absorbency material is present in the absorbent structure in an amount of from about

5 to about 100 weight percent based on total weight of the absorbent structure 16.

Specific examples of disposable diapers suitable for use in the present invention, and other components suitable for use therein, are disclosed in the following U.S. patents and U.S. patent applications:  
U.S. 4,798,603 issued January 17, 1989, to Meyer et al.; U.S. 5,176,668 issued January 5, 1993, to Bernardin; U.S. 5,176,672 issued January 5, 1993, to Bruemmer et al.; U.S. 5,192,606 issued March 9, 1993, to Proxmire et al.; U.S. Patent 5,415,644 issued May 16, 1995, to Enloe; and U.S. Patent Application Serial No. 08/096,654 filed July 22, 1993, in the name of Hanson et al., all of which are incorporated herein by reference. Other suitable components include, for example, containment flaps and waist flaps.

The disposable absorbent articles of the present invention include at least one elasticized area formed from an elastomeric, hot melt, pressure-sensitive adhesive, a first component, and a second component, the first and second components being adhered to one another by said elastomeric, hot melt, pressure-sensitive adhesive. The elastomeric, hot melt, pressure-sensitive adhesive and the elasticized area formed therewith have the following properties:

- A. an adhesive bond strength sufficient to adhere said first and second components together during use of said disposable absorbent article;
- B. an elongation of at least 50 percent;
- C. a retractive force of less than 400 grams force per inch width at 90 percent elongation;
- D. a viscosity of less than 70,000 centipoise at 350° F; and
- E. a cold flow value of less than 20 percent at 54°C.

As used herein, reference to an adhesive bond strength refers to the strength of the bond adhering said first and second components together. The adhesive bond strength can be quantified by the amount of force required to separate the first and second components from one another according to the test method set forth below in connection with the examples. The elastomeric, hot melt, pressure-sensitive adhesive of the



present invention suitably has an adhesive bond strength, as determined by the test method set forth below in connection with the examples, of at least 100 grams force per inch width, suitably of at least 200 grams force per inch width, alternatively of at least 400 grams force per inch width, alternatively of at least from about 200 grams force per inch width to about 700 grams force per inch width.

As used herein, reference to the elongation of the elasticized area formed with the elastomeric, hot melt, pressure-sensitive adhesive refers to the elongation of the elasticized area and is suitably determined as set forth below in connection with the examples. The elasticized area formed with the elastomeric, hot melt, pressure-sensitive adhesive suitably has an elongation of at least 50 percent, alternatively of at least 150 percent, alternatively of from about 50 percent to about 200 percent.

As used herein, reference to the retractive force of the elasticized area formed with the elastomeric, hot melt, pressure-sensitive adhesive refers to the retractive force exhibited by the elasticized area one minute after stretching to 90% of the elongation of the elasticized area, and is suitably determined as set forth below in connection with the examples. The elasticized area suitably has a retractive force of less than about 400 grams force per inch width, alternatively of less than about 275 grams force per inch width, alternatively of from about 100 grams force per inch width to about 250 grams force per inch width.

As used herein, reference to the viscosity of the elastomeric, hot melt, pressure-sensitive adhesive refers to the viscosity, in centipoise at 350°F, as determined by a Brookfield Model DV-111 Programmable Rheometer (spindle size of 27) commercially available from E. Johnson Engineering & Sales Co., Elm Hurst, IL 60126. A suitable test method is set forth in American Society for Testing and Materials (ASTM) test method D-3236. The elastomeric, hot melt, pressure-sensitive adhesives of the present invention suitably have a viscosity of less than 70,000 centipoise at 350°F, alternatively of less than 50,000, alternatively of from about 20,000 to about 35,000.

Reference to the cold flow value of the elasticized area formed with the elastomeric, hot melt, pressure-sensitive adhesive refers to the amount of elastic composite growth after the elasticized area has been exposed to a temperature of 54°C for a period of 24 hours. The cold flow value of the elasticized areas are suitably determined as set forth below in connection with the examples. The elasticized area formed with the elastomeric, hot melt, pressure-sensitive adhesives of the present invention suitably have a cold flow value of less than about 20 percent, alternatively of less than 15 percent, alternatively of from about 5 percent to about 10 percent.

A number of elastomeric components are known for use in the design and manufacture of disposable absorbent articles. For example, disposable absorbent articles are known to contain elasticized leg cuffs, elasticized waist portions, and elasticized fastening tabs. Thus, with reference to Fig. 1, the elasticized areas of the disposable absorbent articles according to the present invention may form elasticized leg cuffs 36, waist elastics 38, and elasticized fastening tabs 40. That is, the elastomeric, hot melt, pressure-sensitive adhesives described above may be applied to components of a disposable diaper to form the elasticized areas 42, 44 and 46 indicated as defining elasticized leg cuff 36, waist elastics 38 and elasticized fastening tabs 40, respectively.

The disposable absorbent articles of the present invention need only comprise one elasticized area formed from an elastomeric, hot melt, pressure-sensitive adhesive described above. The elasticized areas are suitably formed by applying the hot melt, pressure-sensitive adhesive described above to one or more components of the disposable absorbent article. For example, the elasticized hot melt, pressure-sensitive adhesives may be applied to the backsheet 12, the topsheet 14, the absorbent structure 16 or a separate component such as a carrier sheet, containment flap, waist flap, or the like, which first component is then brought into contact with and adhered to a second component of the diaper. The second component may be a separate component or may be a different portion of the first component. For example, the elastomeric, hot melt, pressure-sensitive adhesive may be applied to the backsheet 12 which is then adhered to the topsheet 14 to form an elasticized area

which functions as a leg or waist elastic. Alternatively, the elastomeric, hot melt, pressure-sensitive adhesive may be applied to one or both sides of a thin carrier sheet which is then sandwiched between the backsheet and topsheet to form an elasticized area.

5

If the elastomeric, hot melt, pressure-sensitive adhesive is applied directly, or via a carrier sheet, to one or more components of a disposable absorbent article without first being stretched, the component(s) to which it is applied will need to be capable of being stretched in a least one direction in order to produce an elasticized area. For example, the component could be necked, or gathered, in order to allow it to be stretched after application of the elastomeric, hot melt, pressure-sensitive adhesive. Various post treatments, such as treatment with grooved rolls, which alter the mechanical properties of the garment component, are also suitable for use.

10  
15

The elastomeric, hot melt, pressure-sensitive adhesives are suitably applied to one or more components of the disposable absorbent article by spraying, film forming, slot coating, and the like. By carefully selecting the viscosity of the elastomeric, hot melt, pressure-sensitive adhesives, the adhesives can be applied with conventional adhesive application systems, such as spray nozzles, slot coating, and the like.

20

Alternatively, the elastomeric, hot melt, pressure-sensitive adhesive may be applied to a chill roll or similar device, in the form of a strand or ribbon. The strand or ribbon is then stretched and thinned, and applied to the first component and second component to form an elasticized area.

25

After being applied to the disposable absorbent article, the elastomeric, hot melt, pressure-sensitive adhesive suitably contracts to gather the components of the disposable absorbent article to which it is attached. The elastomeric, hot melt, pressure-sensitive adhesives are capable not only of introducing a degree of elasticity to the disposable absorbent article, but are also capable of providing a construction adhesive function. That is, the adhesives adhere together the components of the disposable absorbent article to which they are in contact. Thus, in one embodiment, it is preferred that the elasticized area formed from the elastomeric, hot melt, pressure-sensitive adhesive described above be

30  
35

free of other adhesive materials, preferably of both other adhesive materials and other elastomeric materials. It is also possible that the elastomeric, hot melt, pressure-sensitive adhesives do not constrict upon cooling but, instead, tend to retract to approximately its original dimension after being elongated during use of the product. This, of course, necessitates that the component of the disposable absorbent article to which such an elastomeric, hot melt, pressure-sensitive adhesive is attached be capable of being elongated in at least one direction.

10

The elasticized areas are suitably formed by applying the elastomeric, hot melt, pressure-sensitive adhesives to the disposable absorbent article in the form of a film. The film suitably has a thickness of about 0.001 inch to about 0.05 inch, alternatively of from about 0.001 to about 0.01, and a width of from about 0.05 inch, to about 3.0 inches, alternatively of from about 0.5 inch to about 1.5 inches. When the elastomeric, hot melt, pressure-sensitive adhesive is in the form of a film, the film can impart barrier properties to the elasticized area formed therewith.

20

Suitable elastomeric, hot melt, pressure-sensitive adhesives comprise elastomeric polymers, tackifying resins, plasticizers, oils and antioxidants. Such elastomeric, hot melt, pressure-sensitive adhesives are available from Findley Adhesives, Inc., Wauwatosa, WI, under the trade designation Findley H2503 and H2504.

25

Fig. 2 illustrates a cross-sectional view taken along line 2-2 of Fig. 1.

#### Test Methods

##### 30 Adhesive Bond Strength

The adhesive bond strength of an elasticized area according to the present invention is determined as follows. A test sample of the elasticized area is cut from the absorbent product. The elasticized area preferably has the dimensions of 2.0 inches wide by 4.0 inches long. If the elasticized area is not this large, the largest sample possible (but less than 2.0" x 4") is used for testing. It is not necessary for the sample to be tested to have an elastomeric, hot melt, pressure-sensitive adhesive located continuously across the length and/or width of the

sample. Thus, for example, if the elastomeric, hot melt, pressure-sensitive adhesive is applied between the first and second components in a spray pattern, line pattern, or other intermittent application, a test sample having the stated length and width can be cut  
5 from the product so as to encompass that area of the elasticized area having generally the greatest coverage of the elastomeric, hot melt, pressure-sensitive adhesive across its width and length. The adhesive bond strength is determined through the use of a tensile tester such as a SINTECH tensile tester commercially available from the Sintech Co.,  
10 Carry, North Carolina, Model No. 11. A 90° peel adhesion test is run in order to determine the grams of force needed to pull apart the first and second components of the elasticized area. Such a test method is generally described in Pressure Sensitive Tape Counsel Test Method 1. Specifically, 1.25 inches or more of the 4 inch length of the test sample  
15 has the first and second components peeled apart. The first component is then clamped in the upper jaw of the tensile tester, and the second component is clamped in the lower jaw of the tensile tester. The tensile tester is set to the following conditions:

20	Crosshead Speed:	300 millimeters per minute
	Full-scale load:	5,000 grams
	Start measurements:	10 millimeters
	Gauge Length:	(jaw spacings) 1.0 inch

The Instron tensile tester is then engaged. The test is terminated after  
25 approximately 100 millimeters on a 2" x 4" sample. Twenty data points per second are collected for a total of about 400 data points. The average of these data points is reported as the adhesive bond strength. The results from the tensile tester are normalized to a sample having a width of 1 inch. At least three test samples are subjected to the above  
30 testing with the results being averaged and normalized to produce the reported adhesive bond strength.

#### Elongation

The elongation of an elasticized area according to the present invention  
35 is suitably determined as follows. A 1" wide by 4" long elasticized area is provided. The central 3 inch area of the sample is marked. The test sample is then stretched to its maximum length, and the distance between

the marks is measured and recorded as the "stretched to stop length."  
The percent elongation is determined according to the following formula:

$$\frac{\text{stretched to stop length} - 3}{3} \times 100$$

If a 1" x 4" elasticized area is not available, the largest sample possible (but less than 1" x 4") is used for testing with the test method being adjusted accordingly.

#### 10 Retractive Force

The retractive force of an elasticized area according to the present invention is determined on a test sample having a width of 1 inch and a length of 3 inches. A test apparatus having a fixed clamp and an adjustable clamp is provided. The adjustable clamp is equipped with a strain gauge commercially available from S. A. Mieier Co. under the trade designation Chatillon DFIS2 digital force gauge. The test apparatus can elongate the test sample to a given length. One longitudinal end of the test sample is clamped in the fixed clamp of the test apparatus with the opposite longitudinal end being clamped in the adjustable clamp fitted with the strain gauge. The test sample is elongated to 90 percent of its elongation (as determined by the test method set forth above). The retractive force is read from the digital force gauge after 1 minute. At least three samples of the elasticized area are tested in this manner with the results being averaged and reported as grams force per inch width.

#### Cold Flow

The cold flow properties of the elasticized area according to the present invention is determined on a test sample having a width of 1 inch and a length of 3 inches. The test sample is placed in an aging room at a temperature of 54°C for 24 hours. At the end of that time, the test sample is removed from the aging room and the length of the test sample is measured and recorded as the "aged length." The percent cold flow is determined by the following formula:  $[(\text{Aged length} - \text{original length}) / \text{original length}] \times 100$ .

ExamplesExample 1

An elastomeric, hot melt, pressure-sensitive adhesive available from Findley Adhesives under the trade designation of H-2504 was processed  
5 through a Nordson hot melt glue system (available from the Nordson Corporation) at a temperature of 350°F. The material was passed through a slot die having a width of 6 inches and a thickness of 8 mils. The elastomeric, hot melt, pressure-sensitive adhesive was then placed on a chill roll having a temperature of 56-57°F traveling at a speed of 6 feet  
10 per minute. The elastomeric, hot melt, pressure-sensitive adhesive was then stretched to approximately 575-600% of its length and was brought into contact with two webs of material. The first web of material was a 0.5 ounce per square yard, 2 denier per filament polypropylene spunbond material, thermally bonded to a 0.4 mil (0.3 ounce per square yard) cast  
15 film. The second web of material was a pointbonded carded web of 2-2.5 denier per filament side by side polyethylene/polypropylene bicomponent fibers having a basis weight of 0.7 ounce per square yard. Both web materials had a width greater than the quenched elastomeric, hot melt, pressure-sensitive adhesive. The quenched elastomeric, hot melt,  
20 pressure-sensitive adhesive was placed between the two web materials and run through a compression roll having a nip pressure of 100 pounds per square inch. The elastomeric, hot melt pressure-sensitive adhesive was bonded to the film side of the first web. The finished laminate was allowed to retract and was collected. The finished laminate had the  
25 following properties; an adhesive bond strength of 655.2 grams per one inch width; an elongation of 150%; a 125 gram retractive force and a cold-flow value of 0%.

Example 2

30 An elastomeric, hot melt, pressure-sensitive adhesive available from Findley Adhesives under the trade designation H-2504 was processed through a Nordson hot melt glue system at a temperature of 350°F. The material was passed through a slot die having a width of 6 inches and a thickness of 8 mils. The elastomeric, hot melt, pressure-sensitive  
35 adhesive was then placed on a chill roll having a temperature of 56-57°F traveling at a speed of 6 feet per minute. The elastomeric, hot melt, pressure-sensitive adhesive was then stretched approximately 575-600% of its length and was brought into contact with two pointbonded, bonded

carded webs of 2-2.5 denier per filament side-by-side polyethylene/polypropylene bicomponent fiber webs having a basis weight of 0.7 ounce per square yard. The quenched elastomeric, hot melt, pressure-sensitive adhesive was located between the two web materials and run through a compression roll having a nip pressure of 100 pounds per square inch. The finished laminate was allowed to retract and was collected. The finished laminate had the following properties; an adhesive bond strength of 457.8 grams per one inch width; an elongation of 160%; a 133 gram retractive force; and a cold-flow value of 8.3%.

10

#### Example 3

An elastomeric, hot melt, pressure-sensitive adhesive available from Findley Adhesives under the trade designation of H-2503 was processed through a Nordson hot melt glue system at a temperature of 375°F. The material was passed through a slot die having a width of 6 inches and a thickness of approximately 3 mils. The elastomeric, hot melt, pressure-sensitive adhesive was then placed on a chill roll having a temperature of 56-57°F traveling at a speed of approximately 20 feet per minute. The elastomeric, hot melt, pressure-sensitive adhesive was then stretched 575% of its length and was brought into contact with two webs of polypropylene spunbond material having a basis weight of 0.7 ounce per square yard and being formed from 3 denier per filament fibers. Both spunbond materials have a width greater than the quenched elastomeric, hot melt, pressure-sensitive adhesive. The quenched elastomeric, hot melt, pressure-sensitive adhesive was placed between the two spunbond layers and passed through a compression nip roll having a nip pressure of 100 pounds per square inch. The finished laminate was allowed to retract and was collected. The finished laminate had the following properties; an adhesive bond strength of 612 grams per one inch width; an elongation of 105%; a 116 gram retractive force; and a cold-flow value of 8.3%.

#### Comparative Example 4

An elastomeric, hot melt, pressure-sensitive adhesive available from Findley Adhesives under the trade designation of H-2209 was processed through a hot melt glue system at 325-350°F. The material was passed through a slot die having a width of 1.50 inch and a thickness of approximately 10 mils and placed on a strip of differential release liner material commercially available from Akrosil Inc. A piece of the H-2209



material 1.50 inches wide by 1.0 inch long was removed from the release liner material, elongated 1200 percent, and was placed between two layers of 3 denier per filament, 0.7 ounce per square yard polypropylene spunbond material, and was nipped at a pressure of 90 pounds per square inch. The finished laminate was allowed to retract and was collected. The finished laminate had the following properties; an adhesive bond strength of 162 grams per inch width; an elongation of 125%; a 174 gram retractive force; and a cold-flow value of 50 to 100%.

- 10 While the present invention has been described in terms of the specific embodiments set forth herein, those skilled in the art will recognize numerous variations and alterations thereof which are intended to be within the scope of the claims appended hereto.

What is claimed:

1. A disposable absorbent article having a length and a width defining first and second waist portions and first and second longitudinal marginal portions, said article comprising the following components:

a backsheet layer;

a topsheet layer; and

an absorbent structure located between said topsheet layer and said backsheet layer, said article including at least one elasticized area formed from an elastomeric, hot melt, pressure-sensitive adhesive, a first component and a second component, said first and second components being adhered to one another by said elastomeric, hot melt pressure-sensitive adhesive, said elastomeric, hot melt pressure-sensitive adhesive and the elasticized area formed therewith having the following properties:

- a) an adhesive bond strength sufficient to adhere said first and second components together during use of said disposable absorbent article;
- b) an elongation of at least 50 percent;
- c) a retractive force of less than 400 grams force per inch width at 90 percent elongation;
- d) a viscosity of less than 70,000 centipoise at 350°F; and
- e) a cold flow value of less than 20 percent at 54°C.

2. The disposable absorbent article according to claim 1 wherein said elastomeric, hot melt, pressure-sensitive adhesive has an adhesive bond strength of at least 100 grams force per inch width.

3. The disposable absorbent article according to claim 1 wherein said elastomeric, hot melt, pressure-sensitive adhesive has an adhesive bond strength of at least 400 grams force per inch width.

4. The disposable absorbent article according to claim 1 wherein said elasticized area has an elongation of at least 150 percent.

5. The disposable absorbent article according to claim 1 wherein said elasticized area has an elongation of from 50 percent to 200 percent.

6. The disposable absorbent article according to claim 1 wherein said elasticized area has a retractive force of less than 275 grams force per inch width.
7. The disposable absorbent article according to claim 1 wherein said elasticized area has a retractive force of from about 100 grams force per inch width to about 250 grams force per inch width.
8. The disposable absorbent article according to claim 1 wherein said elasticized area has a cold flow value of less than 15 percent at 54°C.
9. The disposable absorbent article according to claim 1 wherein said elastomeric, hot melt, pressure-sensitive adhesive is in the form of a film.
10. The disposable absorbent article according to claim 9 wherein said film has a thickness of from about 0.001 inch to about 0.05 inch, and a width of from about 0.05 inch to about 3.0 inches.
11. The disposable absorbent article according to claim 10 wherein said film has a thickness of about 0.001 inch to about 0.01 inch and a width of from about 0.5 inch to about 1.5 inches.
12. The disposable absorbent article according to claim 1 wherein said elasticized area is present in said first and second longitudinal marginal portions.
13. The disposable absorbent article according to claim 10 wherein said elasticized area is present in said first and second longitudinal marginal portions.
14. The disposable absorbent article according to claim 1 wherein said elasticized area is present in said first and second waist portions.
15. The disposable absorbent article according to claim 10 wherein said elasticized area is present in said first and second waist portions.

WO 97/17046

16. The disposable absorbent article according to claim 12, 13, 14, or 15 wherein said first component is said topsheet layer and said second component is said backsheet layer.

17. The disposable absorbent article according to claim 1 further comprising a containment flap.

18. The disposable absorbent article according to claim 17 wherein said containment flap includes said elasticized area.

19. The disposable absorbent article according to claim 18 wherein said first component is said containment flap, and said second component is a different portion of said containment flap.

20. A disposable absorbent article having a length and a width defining first and second waist portions and first and second longitudinal marginal portions, said article comprising the following components:

a) a backsheet layer;

a) a topsheet layer; and

an absorbent structure located between said topsheet layer and said backsheet layer, said article including at least one elasticized area formed from an elastomeric, hot melt, pressure-sensitive adhesive, a first component and a second component, said first and second components being adhered to one another by said elastomeric, hot melt, pressure-sensitive adhesive, said elastomeric, hot melt, pressure-sensitive adhesive and the elasticized area formed therewith having the following properties:

- a) an adhesive bond strength of at least 100 grams force per inch width;
- b) an elongation of at least 150 percent;
- c) a retractive force of less than 275 grams force per inch width at 90 percent elongation;
- d) a viscosity of less than 50,000 centipoise at 350° F; and
- e) a cold flow value of less than 15 percent at 54°C.



# INTERNATIONAL SEARCH REPORT

International Application No

PC/US 96/16081

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61F13/15 A61L15/58

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61F A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 386 816 A (PROCTER & GAMBLE) 12 September 1990 see column 2, line 32 - line 39 see column 9, line 11 - line 16 see column 9, line 40 - line 47 see column 13, line 9 - line 18 see column 15, line 24 - line 28; claims 1-11 ---	1,4,5,9, 12-15,20
A	US 4 698 242 A (SALERNO CATHERINE E) 6 October 1987 see column 4, line 33 - column 5, line 28; tables 1,2 --- -/-	1-5,8,9, 12-16,20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*&\* document member of the same patent family

Date of the actual completion of the international search

20 February 1997

Date of mailing of the international search report

10.03.97

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+ 31-70) 340-3016

Authorized officer

Mirza, A

# INTERNATIONAL SEARCH REPORT

International Application No  
PL/US 96/16081

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 4 259 220 A (BUNNELLE WILLIAM L ET AL) 31 March 1981 see column 3, line 13 - line 40 see column 4, line 23 - line 31 see column 11, line 39 - line 51 see column 12, line 44 - line 47 see column 18, line 5 - line 7 see column 19, line 1 - line 15; claim 1 ---</p>	1-5,8,9, 12-20
A	<p>US 5 376 430 A (SWENSON DOUGLAS A ET AL) 27 December 1994 see column 3, line 21 - line 36 see column 3, line 59 - line 67 see column 5, line 6 - line 9 see column 8, line 67 - column 9, line 6; claim 19; table 2 ---</p>	1,4,5, 9-16,20
A	<p>WO 89 05334 A (EASTMAN KODAK CO) 15 June 1989 see page 2, line 30 - page 3, line 9 see page 5, line 22 - line 26 see page 6, line 6 - line 11; claims 1,5; tables 1-3 ---</p>	1-5,9, 12-16,20
A	<p>EP 0 368 141 A (FULLER H B CO) 16 May 1990  see abstract see page 4, line 37 - line 39; claims 5-9; tables 4,6 ---</p>	1-5,8,9, 12-16,20
A	<p>US 4 801 485 A (SALLEE LORRY F ET AL) 31 January 1989 see column 6, line 35 - line 54 -----</p>	1-5,8,9, 12-16,20

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PL./US 96/16081

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0386816	12-09-90	US-A- 5037416	06-08-91
		AU-B- 645006	06-01-94
		AU-A- 5079990	20-09-90
		CA-A- 1335229	18-04-95
		CN-A,B 1045347	19-09-90
		DE-D- 69008008	19-05-94
		DE-T- 69008008	29-09-94
		EG-A- 19139	29-09-94
		ES-T- 2052156	01-07-94
		FI-B- 96093	31-01-96
		HK-A- 94896	07-06-96
		IE-B- 63626	17-05-95
		JP-A- 3202056	03-09-91
		-----	
US-A-4698242	06-10-87	NONE	
-----			
US-A-4259220	31-03-81	AU-B- 576875	08-09-88
		AU-A- 4425985	17-10-85
		AU-A- 5808480	13-11-80
		EP-A- 0016835	15-10-80
		JP-C- 1502877	28-06-89
		JP-A- 62048781	03-03-87
		JP-B- 63050392	07-10-88
		JP-B- 61027182	24-06-86
		JP-T- 55500731	02-10-80
		WO-A- 8000676	17-04-80
		US-A- 4418123	29-11-83
		US-A- 4543099	24-09-85
		-----	
US-A-5376430	27-12-94	AU-B- 669920	27-06-96
		AU-A- 4535093	24-01-94
		AU-A- 5070796	04-07-96
		CA-A- 2129981	06-01-94
		DE-D- 69304066	19-09-96
		DE-T- 69304066	20-02-97
		EP-A- 0646062	05-04-95
		EP-A- 0703068	27-03-96
		ES-T- 2091016	16-10-96
		IL-A- 105744	31-01-96
		JP-T- 7508473	21-09-95



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/16081

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-5376430		WO-A- 9400292	06-01-94
		US-A- 5422178	06-06-95
		US-A- 5462708	31-10-95
WO-A-8905334	15-06-89	DE-D- 3888210	07-04-94
		DE-T- 3888210	22-09-94
		EP-A- 0398896	28-11-90
		JP-T- 3501136	14-03-91
		US-A- 4886853	12-12-89
		US-A- 5021257	04-06-91
EP-A-0368141	16-05-90	US-A- 5024667	18-06-91
		AT-T- 107175	15-07-94
		CA-A- 2002358	07-05-90
		DE-D- 68916179	21-07-94
		DE-T- 68916179	26-01-95
		JP-C- 1867586	26-08-94
		JP-A- 2232049	14-09-90
		US-A- 5057571	15-10-91
US-A-4801485	31-01-89	US-A- 4846827	11-07-89